

prise open one of these tepals, clamber into the flower with their legs around the style, and receive pollen on the dorsal surface of their thorax from one of the primary anthers. When entering another flower, this pollen is deposited on the glandular hood of the inner tepal being prised open. The pollen germinates and penetrates the style only when the flower wilts and the tepal hoods are appressed against the stigma. Megachilid (leafcutter) bees are apparently the most important pollinators of *Albucca* species; this was confirmed by experiments involving virgin flowers in which we found that megachilids deposited and removed more pollen grains per visit than did honeybees. We also established that pollen transfer in *Albucca* populations is generally more efficient than in plants with conventional stigmatic pollen receipt. The floral conservatism in the genus *Albucca* apparently reflects the dedicated function of the inner tepals for mechanically filtering flower visitors, protecting the primary anthers from pollen-collecting insects, and transferring pollen to the stigma.

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An overview of the biological properties of volatile compounds - examples from the South African flora

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For many decades, essential oils produced by aromatic plants have been used to treat various ailments such as malaria and microbial. Many indigenous plants used in traditional health care are aromatic and this has prompted scientific investigations into the biological activities and chemical composition of several indigenous species. The antimicrobial, antimalarial, anti-oxidant and anti-inflammatory activities of selected South African aromatic plants used in traditional medicine will be discussed with emphasis on the Lamiaceae, Verbenaceae, Rutaceae, Geraniaceae and Asteraceae. The essential oil of *Vitex poora* exhibited good antimalarial activity (IC₅₀: 6.6×10^{-4} µg/ml), however the oil was also very toxic to kidney cells (IC₅₀: 4.2×10^{-6} µg/ml). The essential oil of *Salvia africana-caerulea* exhibited good antibacterial activity against *Bacillus cereus* (MIC value: 0.75 mg/ml) and also showed promising antimalarial activity (IC₅₀: 4.76 µg/ml). *Agathosma betulina*, often used topically to treat inflammation, inhibits the 5-lipoxygenase enzyme which is involved in the inflammation process (IC₅₀: 35.2 µg/ml). The paper will unequivocally illustrate the diverse biological properties of aromatic plants and emphasise the importance to record the pharmacological activity of ethnomedicinally important species.

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The use of aeroponics to investigate desiccation tolerance in the roots of the resurrection plant, *Xerophyta viscosa*

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The ability of resurrection plants to tolerate desiccation in vegetative tissues has fascinated researchers in the field. In order to understand the whole plant mechanism of attaining desiccation tolerance, we undertook to investigate the root tissues of the resurrection plant *Xerophyta viscosa*, as previous work has only been conducted on the leaf vegetative tissues of resurrection plants. An aeroponic plant growth system was designed and optimised to observe the roots response to desiccation without the restrictions of a soil medium and enable easy access to roots. The growth of both *X. viscosa* and control maize (*Zea mays*) plants were accomplished by regular spraying of roots with nutrient solution and dehydration was conducted through reduction of nutrient spraying. For the rehydration process *X. viscosa* plants were flooded with solution and were able to recuperate in under 48 hrs. Root relative water content and changes in antioxidant activity in response to desiccation were monitored. It was found through taking root water content samples that the roots are able to dry at a rapid rate aeroponically, in comparison to control plants dehydrating in soil. The antioxidant potential during dehydration was monitored and found to be active at a constant level between 80% and 5% RWC for antioxidant enzymes and at relatively high concentrations of 70 µM and 100 µM for the housekeeping antioxidants, ascorbate and glutathione, respectively.

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Molecular characterisation of pathogenesis-related protein 10 from *Xerophyta viscosa*

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Xerophyta viscosa is a poikilochlorophyllous, desiccation tolerant plant that is able to withstand long periods of drought. The protective mechanisms that allow survival under abiotic stress conditions are being studied at the molecular level. A cDNA clone encoding a pathogenesis-related family 10 protein from *X. viscosa* (designated as XvIPR10) was isolated and characterised. XvIPR10 encoded a 152 amino-acid, hydrophilic polypeptide with a molecular weight of 16.5 kDa and pI of 5.05 at pH 7. Phylogenetic and multiple sequence alignment analysis revealed that XvIPR10 had high identity (45.96%) and was related to AoPRP (AJ132610) from *Asparagus officinalis*. The recombinant XvIPR10 protein was over-expressed in a prokaryotic expression system and the protein exhibited ribonucleolytic activity against yeast transfer RNA. Furthermore a

qualitative antimicrobial assay indicated that the recombinant XvIPR10 could inhibit growth of the plant pathogen, *Pseudomonas syringae*. Differential expression of *XvIPR10* during dehydration stress was assessed at the transcriptional level by quantitative real time polymerase chain reaction. It was found that the gene transcript increases by up to 14 fold in relation to non-stressed, hydrated *X. viscosa*. Transient expression of XvIPR10 in onion epidermal cells using a yellow fluorescent protein fusion construct suggested that XvIPR10 localises to the cytoplasm and nucleus. The functional role of the protein during abiotic stress is unknown but the protein could have a role in endogenous RNA breakdown during drought and/or protect the plant from pathogen infection.

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In vitro* propagation of *Dierama erectum

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Dierama erectum Hilliard (*Iridaceae*) is a species with horticultural potential and medicinal value. Its corms are used as a remedy for venereal diseases and its long tough leaves are used as cordage. Seeds collected from the wild are however frequently attacked by bruchid beetles (*Urodon lili*) thus creating a problem with cultivation. Micropropagation techniques were thus investigated with the intention of rapidly propagating this species. Seeds were decontaminated and germinated on one-tenth strength Murashige and Skoog (MS) medium devoid of hormones and sucrose. The highest percentage decontamination was obtained when 0.2% HgCl₂ was used for 20 min. Leaves, hypocotyls and roots were cultured with various concentrations of α -naphthaleneacetic acid (NAA) and N⁶-benzylaminopurine (BA). Shoot induction from hypocotyl explants was achieved in the presence of a cytokinin (BA) with or without auxin (NAA). Root explants only continued elongating. Leaf explants showed no response at all hormone concentrations used. Effects of different types and concentrations of cytokinins (kinetin, zeatin, BA and meta-topolin) with or without NAA and varied sucrose levels are being tested on organogenesis of *D. erectum*.

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Floristic links between the West Coast and South Coast (South Africa) - is the Breede River Valley a migration route?

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The Breede River Valley (BRV) (characterized by remarkably heterogenic landscapes) comprises several distinct vegetation types which support highly diverse floras. Moreover, this unique river valley forms a lowland link between the western and southern coastal lowland regions of Greater Capensis. Several affinities of this valley with the bordering coastal regions induced the hypothesis that the BRV might have functioned as a migration corridor for plants between the West Coast and South Coast. The main aim of this research is to characterize the patterns of floristic and vegetation diversity in the BRV through a large scale diversity assessment. In particular, vegetation types that are shared between the BRV, West and South coasts (Shale Renosterveld, Sand Fynbos and Saline vegetation units) are being investigated and compared in terms of alpha diversity, beta diversity, species composition overlap and endemism. These should enable the identification of specific habitat corridors that specific plants could have utilized for migrations. To assist in the identification of a migration corridor, and migration directionality, the spatial distribution of genetic variation for populations of plant taxa with known distribution ranges that spans the BRV and both the particular coastal regions have been assessed. These include *Oxalis pardalis*, typical of Shale Renosterveld, *Brunsvigia orientalis*, typical of Sand Fynbos and *Sarcocornia pillansii*, a typical species occurring in saline vegetation.

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Prioritising areas for the management of invasive alien plants in the CFR: different strategies, different priorities?

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The spatial prioritisation, i.e. the selection of areas which should be cleared and managed first, is one of the central problems in managing invasive alien plants (IAPs) in a situation with limited financial and human resources. We developed, together with managers and other scientists, a prioritisation scheme for management of IAPs, which is presented in the poster "Identifying priority areas for the management of invasive alien plants in the Cape Floristic Region". Although the principal approach of selecting factors which have to be considered when prioritising areas for IAP management, as well as assigning weights to them is widely accepted, the factor weights have to be seen as a compromise and strong diverging opinions exist on their validity. Therefore, we need to investigate how robust these spatial priorities are and how strong they are influenced by changes in these weights. To address this important question, we developed, based on our base scenario which is described in the poster, several alternative prioritisation scenarios, which differ in the respective weights of the factors, plus a null model which consists of random priorities. For each